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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,139	10/10/2003	D.V.G.L.N. Rao	UMAB-020XX	1285

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EXAMINER	
PATEL, JAYESH A	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/684,139	Applicant(s) RAO ET AL.	
	Examiner Jayesh A. Patel	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 31 December 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-28 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-28 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 19 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's response to the last office action, filed 12/31/2007 has been entered and made of record.

2. Applicant's amendments have required new grounds of rejection. New grounds of rejection are therefore presented in the office action.

3. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1--- are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al. (US 5854710) hereafter Rao in view of Alfano et al. (US 5710429) hereafter Alfano.

1. Regarding claim 1, Rao discloses an optical system **(Fig 1)** for processing an input medical image **(Col 5 Lines 22-25 and Col 12 Lines 15-18)** of bodily tissue **(Fig 1 Elements 16,16' and Col 5 Lines 22-25. The input image generated by**

medical imaging technique would include imaging a bodily tissue) the system comprising; a light source **(Fig 1 Element 14')** emitting light directed at the input medical image of bodily tissue; a first optical Fourier element that fourier transforms light from the input image **(Fig 1 Element 20)**; a second optical Fourier element that receives the filtered transformed light and inversely fourier transforms the filtered transformed light to provide a processed medical image of the bodily tissue including the second frequency component **(Fig 1 lens 22)**; and an image sensor that detects the processed medical image and generates an electronic representation of the processed medical image at **(Fig 1 Element 26)**. Rao discloses a spatial filter **(Fig 1 element 12)** that filters the transformed light by removing a first frequency component and transmitting a second frequency component at **(Col 4 Lines 10-11, Col 12 Lines 38-46. The film 12 transmits a variably polarized image beam including a plurality of polarized components (first frequency) and blocking the rest (second frequency. Low, band and high pass filtering can be achieved by varying the intensities of the beams.))**. Rao also discloses spatial filtering in fourier plane at **(Col 2 Lines 44-49 and Col 7 Lines 25-30)** but for further explanation and clarification Alfano's reference discloses a spatial filter in the fourier plane **(Col 1 lines 43-44)** that filters the transformed light by removing a first frequency component and transmitting a second frequency component at (**Col 3 Lines 64-68 where most of the diffusive component (one frequency) is filtered out and the ballast and snake component (another frequency) are allowed)**.

Alfano further discloses that the spatial fourier filtering can be used for various medical and non medical applications and the image quality can be greatly improved at **(Col 3 lines 1-5 and Col 4 Lines 5-8)**. Alfano and Rao are from the same field of endeavor and are analogous art, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Alfano in the system and method of Rao for the above reasons.

2. Regarding Claim 2, Rao and Alfano disclose the optical system of Claim 1. Rao further discloses wherein the input image comprises a two-dimensional image generated by a medical imaging method at **(Col 5 Lines 22-25 and Col 12 Lines 10-18)**.

3. Regarding Claim 5, Rao and Alfano discloses the optical system of Claim 1. Rao further disclose wherein the input image is generated by at least one of an x-ray, magnetic resonance, computerized axial tomography and ultrasound imaging method at **(Col 5 Lines 22-25 and Col 12 Lines 15-18)**.

4. Regarding Claim 6, Rao and Alfano discloses the optical system of Claim 1. Rao further disclose wherein the light source comprises a laser at **(Col 10 Lines 66 through Col 11 Lines 2)**.

5. Regarding Claim 7, Rao and Alfano disclose the optical system of Claim 6. Rao further disclose wherein the laser comprises a diode pumped laser at **(Col 8 Lines 28-29)**.

6. Regarding Claim 8, Rao and Alfano disclose the optical system of Claim 1. Rao further disclose wherein the first and second optical Fourier elements are lenses at **(Col 4 Lines 65-66 and Fig 1 Elements 20,22)**

7. Regarding Claim 9, Rao and Alfano disclose the optical system of Claim 1. Rao further disclose wherein the light source emits in a wavelength range of 300 to 800 nm at **(Col 5 Lines 10-11 and Col 11 Lines 2)**. The wavelength of 570 nm is in the range of 300-800 nm.

8. Regarding Claim 10, Rao and Alfano discloses the optical system of Claim 1. Rao further discloses wherein the image sensor comprises the charge-coupled device at **(Col 10 Lines 40)**.

9. Regarding Claim 13, Rao and Alfano disclose the optical system of Claim 6. Rao further disclose wherein the laser emits light having an intensity of 1.5 milliwatt/cm2 **(Col 11 Lines 12-15)**. Rao discloses that the optimum intensity of the input beam will ordinarily vary from 0.1-1000 mw/cm2 **(1.5 mw/cm2)**. Rao further disclose that input beam intensities can be increased or decreased at **(Col 11 Lines 51 and Fig 3)**.

10. Claim 15 is a corresponding method claim of the system of Claim 1. See the explanation of claim 1.The High pass filtering filtering disclosed at **(Col 12 lines 41)** removes low frequency components and allow transmitting high frequency components.

11. Claim 16 is a corresponding method claim of the system of Claim 2. See the explanation of claim 2.

12. Regarding Claim 19, Rao and Alfano discloses the method of Claim 16. Rao further disclose wherein the input image is generated by at least one of an x-ray, magnetic resonance, computerized axial tomography and ultrasound imaging method at **(Col 5 Lines 22-25 and Col 12 Lines 15-18)**.

13. Claim 20 is a corresponding method claim of the system of Claim 6. See the explanation of claim 6.

14. Claim 21 is a corresponding method claim of the system of Claim 7. See the explanation of claim 7.

15. Claim 22 is a corresponding method claim of the system of Claim 8. See the explanation of claim 8.

16. Claim 23 is a corresponding method claim of the system of Claim 9. See the explanation of claim 9.

17. Claim 24 is a corresponding method claim of the system of Claim 10. See the explanation of claim 10.

Claims 11,12 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao in view of Alfano and in further view of Buchan (US 3700902) hereafter Buchan.

18. Regarding Claim 11, Rao and Alfano discloses all the optical system of Claim 1. Rao and Alfano are silent and however does not disclose further comprising a controller that is electronically connected to the image sensor, the Controller actuating readout of the electronic representation from the image sensor.

Buchan discloses **(Fig 5 Elements 170,172,110 and Col 5 Lines 56 through Col 6 Lines 2)**. Rao discloses that the mask based spatial filtering systems cannot operate in real time at **(Col 2 Lines 44-53)**. Rao further disclose the photo chromic material is intensity dependent and can be used in real time optical processing at **(Col 3 Lines 10-19)**. Buchan discloses a variable intensity **(electro-optic layer 62)** based spatial filter, which is more efficient than the mask and the computer programmed methods of spatial filtering at **(Col 1 Lines 51 through Col 2 Lines 11)**. Buchan, Alfano and Rao are from the same field of endeavor and are analogous art therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of spatial filtering as taught by Buchan in the optical processing of the medical images of Rao for the above reasons.

19. Regarding Claim 12, Rao, Alfano and Buchan disclose the system of Claim 11. Buchan further comprising a processor electrically coupled to the controller, an image storage device and a display device **(Fig 5 Elements 170,172,110,174 and Col 5 Lines 56 through Col 6 Lines 2)**.

20. Regarding Claim 25, Rao and Alfano discloses the method of Claim 15. Rao discloses the CCD camera at the image plane **(Col 10 Lines 40)**, however is silent about controller and does not disclose further comprising generating an electronic representation from the image sensor using a controller that is electronically connected to the image sensor.

Buchan discloses the controller **(Fig 5 element 172 and Col 5 Lines 56-61)** generating an electronic representation from the image sensor using a controller that is electronically connected to the image sensor.

Claims 3,17, 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao in view of Alfano and in further view of Trezza (US 20020067535) hereafter Trezza.

21. Regarding Claim 3, Rao and Alfano discloses the optical system of Claim 2.Rao discloses an input image for the optical system being generated by medical imaging techniques at **(Col 12 Lines 10-20)**. Thus it would image any bodily tissue, however is silent about the input image being mammogram. Trezza discloses optical pattern recognition **(Fig 1 Element 28)** is medical field with mammogram and pap smear analysis at **(Para 0007)**. Trezza also discloses that the method and apparatus would permit real time processing of the input images in **(Para 0002)**. Rao, Alfano and Trezza are from the same field of endeavor and are analogous art, therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to use optical image processing for input medical images **(mammograms and pap smear)** as taught by Trezza.

22. Regarding Claim 4, See the explanation of Claim 3 and **(Fig 1 element 28)** with Pap smear.

23. Claim 17 is a corresponding method claim of claim 3. See the explanation of Claim 3.

24. Claim 18 is a corresponding method claim of claim 4. See the explanation of Claim 4.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rao in view of Alfano and in further view of Beraudo (US 4625325) hereafter Beraudo.

25. Regarding Claim 14, Rao and Alfano discloses the optical system of Claim 1. Rao also discloses the optical processing system can be used to process wide variety of optical images **(any optical image that can be projected through a Fourier transform lens including slides and negatives)**. Rao is silent and however does not disclose the image wherein the input image has a size of less than 10 cm sub 2.

Beraudo discloses that the size of the film which are less than 10 cm sub 2 at **(Col 4 Lines 1-3)**. The X-ray film package with the film sizes **(2X3, 3X4 or**

4X5 cm) as disclosed by Beraudo is used as introduction strip (being small) which would facilitate the examination of the x-ray image as well as places on the file the x-ray image in a practical and functional way at **(Col 3 Lines 21-27 and 60-65)**. Both Rao and Beraudo are from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have use the small size of the film as taught by Beraudo in the system of Rao fro the above reasons.

Claim 26 -28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao in view of Alfano and in further view of Burke et al (US 6421454) hereafter Burke.

26. Regarding Claim 26, Rao and Alfano disclose and optical system as disclosed in Claim 1 with a medical image. Neither Rao nor Alfano specifically recite the input medical image being a mammographic image. Burke discloses the input mammographic image **(Radiograph 16, Fig 1 and Col 6 Lines 32-45)**. Burke discloses that mammographically detected calcifications are frequently the only detectable sign of breast cancer, so their proper investigation is crucial at **(Col 2 lines 26-28)**. Alfano further discloses that the spatial fourier filtering can be used for various medical and non medical applications and the image quality can be greatly improved at **(Col 3 lines 1-5 and Col 4 Lines 5-8)**. Rao, Alfano and Burke are from the same field of endeavor and are analogous art, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Burke in the optical system of Rao for the above reasons.

27. Regarding Claim 27, Rao, Alfano and Burke discloses the optical system of Claim 26. Rao further disclose wherein the input image is generated by at least one of an x-ray, magnetic resonance, computerized axial tomography and ultrasound imaging method at **(Col 5 Lines 22-25 and Col 12 Lines 15-18)**.

28. Regarding Claim 28, Rao, Alfano and Burke disclose the optical system of Claim 26. Rao further disclose wherein the light source comprises a laser at **(Col 10 Lines 66 through Col 11 Lines 2)**.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayesh A. Patel whose telephone number is 571-270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jayesh Patel
01/25/08

JP

JINGGE WU
SUPERVISORY PATENT EXAMINER